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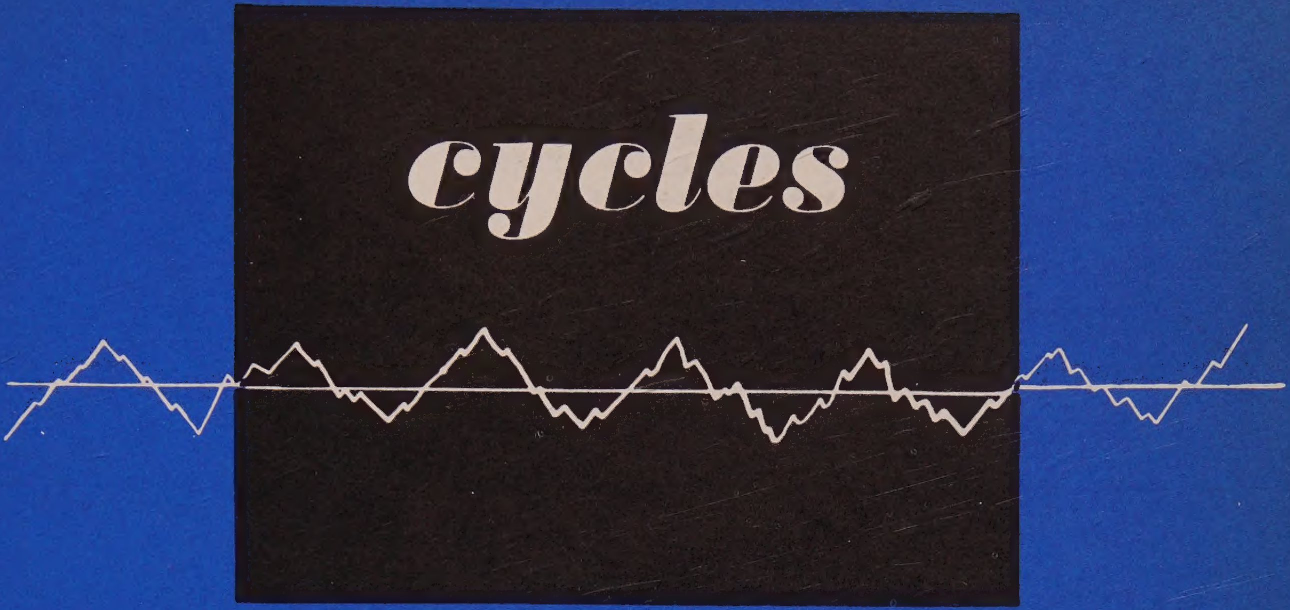

June 1957

FOUNDATION FOR THE STUDY OF CYCLES
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THE DIRECTOR'S LETTER

Dear Member:

The project on which we are engaged—*and at which we are succeeding*—is the scientific forecast of the future.

May I call your attention to the import of that word *scientific*? When something is scientific it can be reproduced by *any* competent worker. It is not a matter of skill or art or judgment or intuition. It is a matter of following the rule book.

Many attempts have been made to forecast the future but almost none of them has been scientific. Let me give you some examples.

Back in the '20's, when women's skirts were getting shorter, a banker friend of mine was asked for a loan by a man who wanted to make women's hats.

"No." he said. "Women's hats will no longer be profitable. Women have only so much to spend. Now that legs are coming into view, men's eyes will be pointed downward. Women are going to spend their money where men are going to look. A loan for women's shoes, yes. A loan for women's stockings, yes. A loan for women's hats, no!"

Now judging by the direction my eyes were usually pointed in those days this was good reasoning and good judgment, but it wasn't what I have chosen to call scientific. It was subjective. Some other banker might have chosen to select some other facts, might have come up with a different solution. You or I, for example, if asked for a loan to make women's hats, might have said yes.

Or take the case of the witches in *Macbeth*. They forecast that Macbeth would never be slain by man born of woman. This forecast was fulfilled. McDuff, who killed him had been "plucked untimely from his mother's womb"--i.e. a caesarian. The forecast came true but it wasn't scientific. It was not reproducible. You or I couldn't do it. Even if they had wished to, the witches couldn't have told us how they did it, or how we could reproduce the result.

Compare these two examples with the famous experiment of Pasteur which disproved the widely held belief that life generated spontaneously. People had noticed that if they boiled broth in a beaker to kill all life and let it stand, life (germs, mold) appeared "spontaneously." Pasteur said, "Not at all. I plugged some cotton in the neck of the beaker so the germs couldn't get in. I boiled the broth to kill the germs already there. I let it stand. The broth had free access to the air. But life did *not* generate." The essence of Pasteur's work is that, with his notebook in front of us to tell us how he did it *anyone*, even you or I, could conduct the same experiment and get the same result. No brains are needed (once Pasteur had devised the experiment); no occult powers are necessary.

With these examples in front of you, pause a moment to consider all the forecasts you ever heard about, or can imagine. You will see that with a very few exceptions they are all based on brains or on intuition or on occult or supernatural powers of some sort. They are not reproducible at will by just anybody. No matter how successful they may have been they are not scientific.

Let us now turn our attention to the exceptions. Six will occur to you immediately. The 12½-hour ebb and flow of the tides. The 24-hour alternation of day and night. The 25-hour reappearance of the moon. The 28-day menstrual cycle. The 29½-day waxing and waning of the moon. The 365¼-day alternation of day and night.

We take this knowledge so for granted that we tend to overlook that its initial discovery was in every sense comparable to Pasteur's experiment. The first amoeba to notice the alternation of light and dark could have written in his notebook. "I notice that light reappears rhythmically at seemingly identical time intervals. If you start with any period of light and wait 6 wogs (the wog was the time interval used by the amoeba; it is equal to four of our hours) it will be light again, and darkness will have intervened." These facts having been written down, any other amoeba could duplicate the experiment. He could note, was it light or dark. He could wait six wogs. He could see, was it light again.

How many million years passed before the discovery of the cycle of the tides I do not know, but eventually it too was discovered, and so, in time, was the cycle of the moon and the cycle of the year. Here matters rested for another 100 million years or so until *now.*

Set thus in its true perspective, we see the modern cycle students as the spiritual descendents of the amoeba who first discovered the cycle of the day and the animals who first discovered the cycle of the year--but oh! how many million years the world has had to wait! We see the modern cycle students as the people who, for the first time in the history of man, are attempting the *scientific* forecast of the future. And in spite of crudities, and even of failure, we see them in the main succeeding!

Cordially yours,

Edward R. Dewey

Edward R. Dewey
Director

WHAT'S AHEAD FOR CORN PRICES

THE 5½-year cycle in corn prices is exercising an upward influence on corn prices at the present time. It will continue to do so until April 1958. From then until February 1961 it will be exercising a downward influence.

Fig. 1 below charts corn prices from January 1949 to date. It also diagrams the 5½-year (67 1/3-month) cycle combined with the basic underlying trend. This diagram charts the most probable course of prices as best it can be determined from a knowledge of this one cycle alone.

Cycle Forecasts Are in Terms of Odds

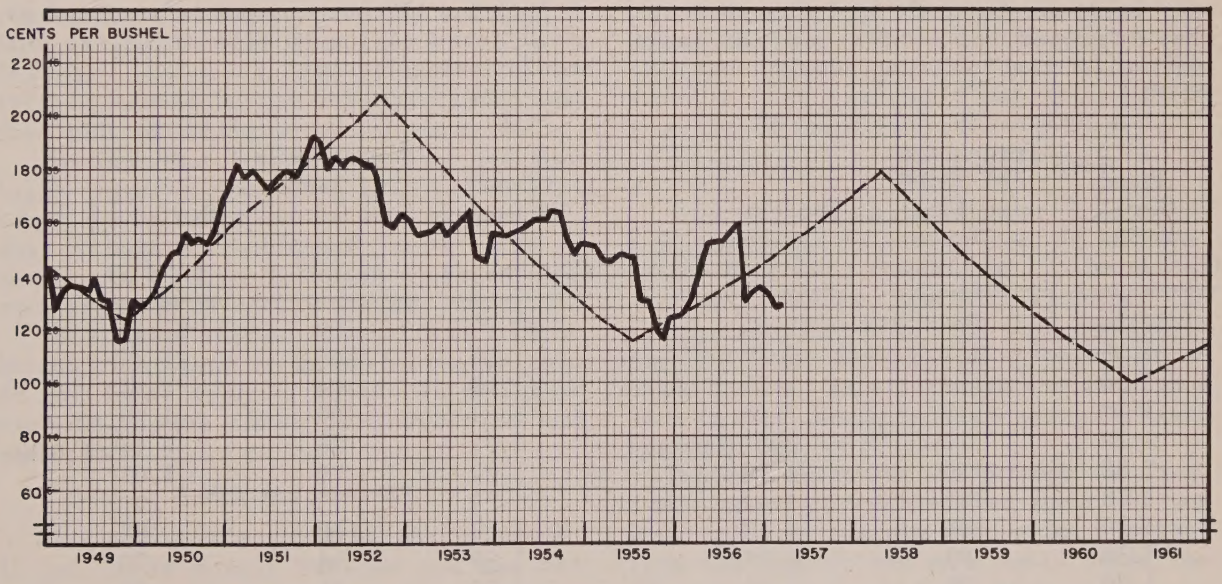
Cycle forecasts are in terms of *odds*. Based on the experience of 1899 to date the odds are 8 to 2 that the price at the next ideal time of crest (April 1958) will be higher than the price ($1.47), for July 1955, the last ideal time of trough. This fact can be read from Table 1 below. Between comparable dates in the past there were eight advances, two declines. Assuming the cycle to be significant, this puts the odds 8 to 2 (4 to 1) in favor of a gain from time of trough to time of crest.

The Gain

How much will the gain be? The probabilities of gain can also be figured. From Table 1 we can read the gains in the past. These are shown in percentages.

Typical Long Gain 53.25%

This table shows you what can be expected, based on past performance of this cycle. The typical (median) gain from ideal



CORN PRICES

Price of No. 3 yellow corn, at Chicago, January 1949—March 1957.
Solid line: Price of corn.
Broken line: 67 1/3-month cycle combined with estimated trend.

time of low to ideal time of high has been 53½%. The odds, as you can read from Table 1 are 6 to 4 that the gain will lie between 22% and 97%. The gains have never (in 10 moves) been more than 158% nor less than -17%. The odds are therefore great that it will not exceed these limits this time either. (Table 1 is on page 157.)

Of course, if government support policies kept the July 1955 price from being as low as it otherwise would have been, the rise from the level of that month can not reasonably be expected to be up to normal proportions. This is the sort of thinking that has to be added to a knowledge of the cycles. As I've said over and over again, a knowledge of cycles is only one element to take into account. However it is an *indispensable* one.

The Most Probable Price

What will be the actual price for April 1958, the ideal time for the next crest? Again, we can give the answer in terms of probabilities.

Because the underlying trend changes its direction so slowly, I have ventured to guess what it will be in the near future. (Trend is the axis around which the cycles oscillate--it is the underlying long-term tendency of advance or decline). My guess for trend at April 1958 is $1.38.

Percentages above trend for each of the ten ideal times of cycle high since 1899 can easily be figured. Applying these to the estimated value of trend for April 1958 we get the following results:

A Trend, April 1958 (Estimated)	B Percentages of Trend at Ideal Times of Crest	C Projected Prices (A x B)	
$1.38	146	$2.01	
1.38	130	1.79	
1.38	123	1.70	
1.38	116	1.60	
1.38	114	1.57	1.53½
1,38	109	1.50	
1.38	103	1.42	
1.38	94	1.30	
1.38	93	1.28	
1.38	89	1.23	

We can therefore say, based on behavior 1899 to date, and assuming the validity of the cycle and the correctness of my guess as to trend, that the most probable price for April 1958 is $1.53½. The odds are 6 to 4 that the price will lie between $1.30 and $1.70. If the price on April 1958 is above $2.01 or below $1.23 it will be farther from trend (if my figure for trend is correct) than it has been at any of the ten ideal times of crest of the 5½-year cycle since 1899.

Typical Short Gain 15.4%

For the decline due to follow April 1958 the short gain at comparable times in the past can be figured the same way, except that I have assumed covering the short positions during all wars--a practice that should always be followed in connection with commodity prices. The typical (median) gains from ideal times of high to ideal time of low has been 17½%. The odds, as you can read from Table 1 are 6 to 4 that the gain will lie between 2% and 40%. The gains have never (in 10 moves) been more than 241% or less than -18%.

What will the actual price be February 1961, the ideal time for the next trough? Again we can give the answer in terms of probabilities.

My guess for the value of trend for February 1961 is $1.29. (This guess should be revised at six month intervals.)

Applying the percentages below trend at ideal times of low to this value, we get the following figures.

A Trend February 1961 (Estimated)	B Percentages of Trend at Ideal Times of Trough	C Projected Prices (A x B)	
$1.29	109	$1.40	
1.29	105	1.35	
1.29	104	1.34	
1.29	100	1.29	
1.29	86	1.11	1.06½
1.29	79	1.02	
1.29	75	.97	
1.29	68	.88	
1.29	54	.70	
1.29	46	.58	

Thus we can say, based on behavior 1899 to date, and assuming the validity of the cycle and the correctness of my guess as to trend, that the most probable price is 106½. The odds are 6 to 4 that the price will lie between 88¢ and $1.34. If the price on February 1961 is higher than $1.40 or lower than 59¢ the price will be farther from trend (if my figure for trend is correct) than it has been at any of the ten ideal times of troughs of the 5½-year cycle since 1899.

Probabilities of Timing

In the same way we can know the *probability* that any given high or low will come at any given distance ahead of or after ideal timing. Because of price control we cannot time the high and the low of the move during World War II, but the other peaks and troughs can be timed easily. From them we know, based on figures from 1899 forward, that a majority of the highs have come within eleven months one way or the other from perfect timing. Hence, assuming the significance of the cycle, we can say the odds are 5 to 4 that the actual crest of the present move will fall between May 1957 (11 months *before* April 1958) and March 1959 (11 months *after* April 1958).

The lows are even more regular. Of the nine determinable lows in the period studied, six have come within four months of perfect timing. Assuming that this regularity continues, the odds are 6 to 3 (2 to 1) that the low due ideally in February 1961 will fall between October 1960 (4 months before February 1961) and June 1961 (4 months after February 1961).

The fact that lows are more regular than highs suggests that along with the 67 1/3-month cycle there may be one or more additional cycles such as 33 months, or 17 months, which have a length close to some even fraction of 67 1/3 months.

Of course prices at the time of the *actual* crest tend to be much greater than at the *ideal* time of crest. It would be easy to figure their probabilities and odds too.

A Weather Analogy

Does all this sound like gobbledygook? If so, it is merely because you are not used to using these concepts in connection with *commodity prices*. You use the same concepts all the time in connection with the weather!

Consider the 12-month temperature cycle at San Francisco for example.

September is the *ideal* month of high temperature; January the *ideal* month of low temperature. The *actual* high month, however, may come anywhere from June to October, the *actual* low month anywhere from December to February.

We could figure, just as we did for corn prices, the various increases from *ideal* month of low to *ideal* month of high and the *range* of temperatures which might be expected at the ideal months; We could also figure the probability that the actual high or low month would or would not fall on the ideal month, or one month one way or the other from the ideal month, or two months one way or the other, etc.

None of this information will tell you exactly what next September's temperature is going to be, or even if September 1957 is going to be the high month of the current cycle, but it does give you *general orientation*. Does this analogy help you?

Cycle Has Come True for 82 Years Since Discovery

Getting back to corn prices, all the probabilities I told you about depend on the continuation of the cycle. If the cycle is not a valid one, our projections have no value. Hence it is worth while to examine the case for the cycle. Basically this case is that the cycle has been coming true for 82 years since discovery!

Discovery of the 5½-Year Cycle

Back in 1875 Samuel Benner discovered a 5½-year cycle in corn prices. It has been coming true ever since.

Samuel Benner, you will remember, is the man who, in 1875, made that remarkable pig iron price forecast of which I have so often spoken. This forecast was made in a book called *Benner's Prophecies of Future Ups and Downs in Prices*.

Benner's forecasts are perhaps the first cycle price forecasts ever made. If you had traded on his pig iron price forecast from the time it was made until World War II your gains would have been *thirty one*

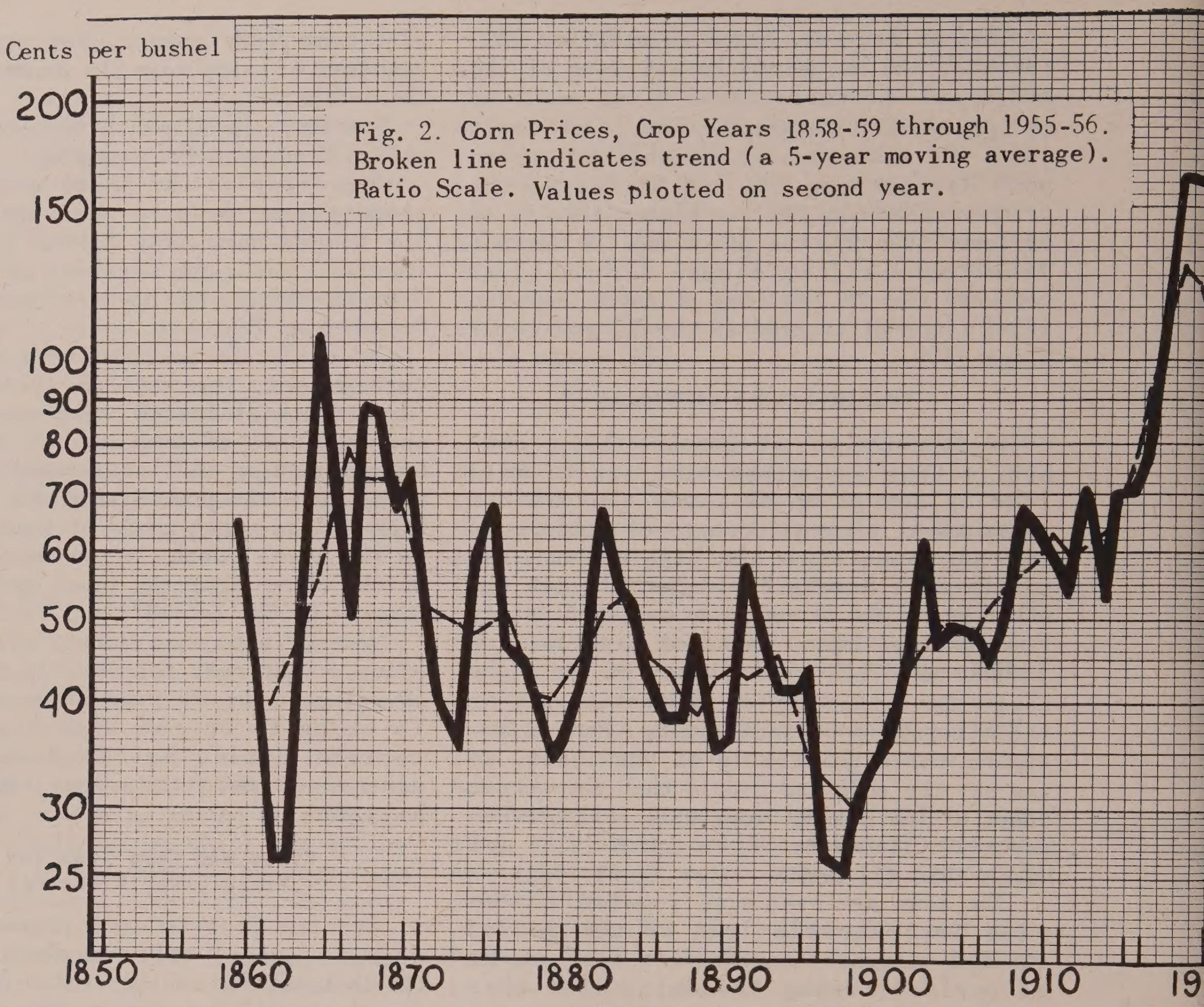


Fig. 2. Corn Prices, Crop Years 1858-59 through 1955-56. Broken line indicates trend (a 5-year moving average). Ratio Scale. Values plotted on second year.

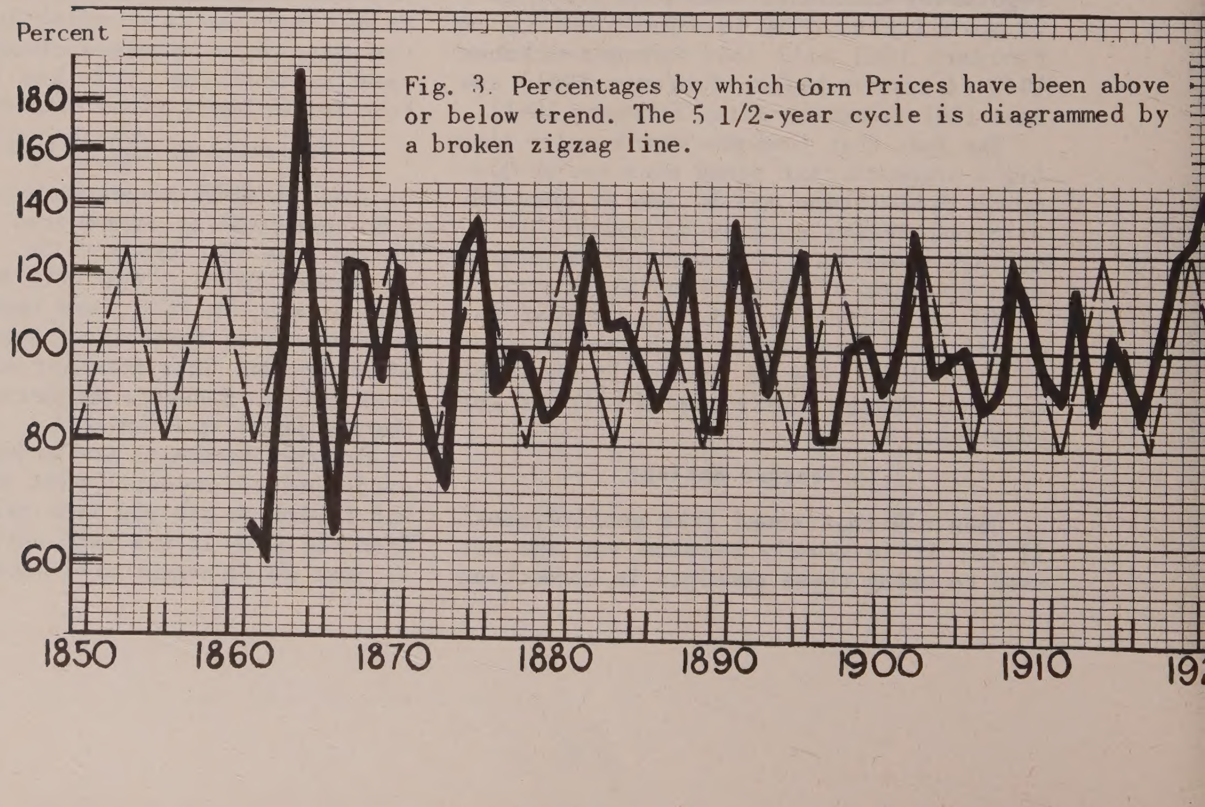
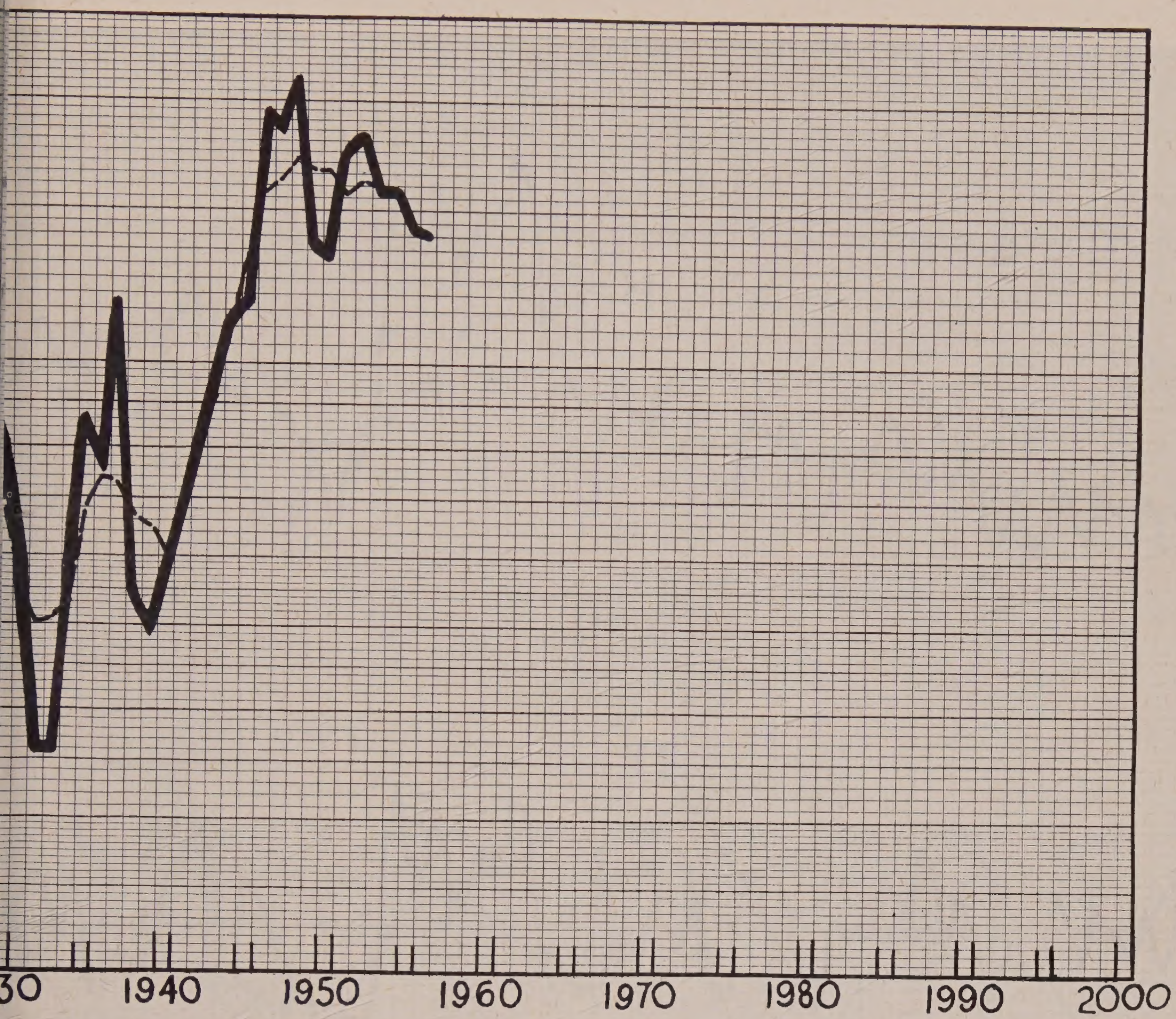


Fig. 3. Percentages by which Corn Prices have been above or below trend. The 5 1/2-year cycle is diagrammed by a broken zigzag line.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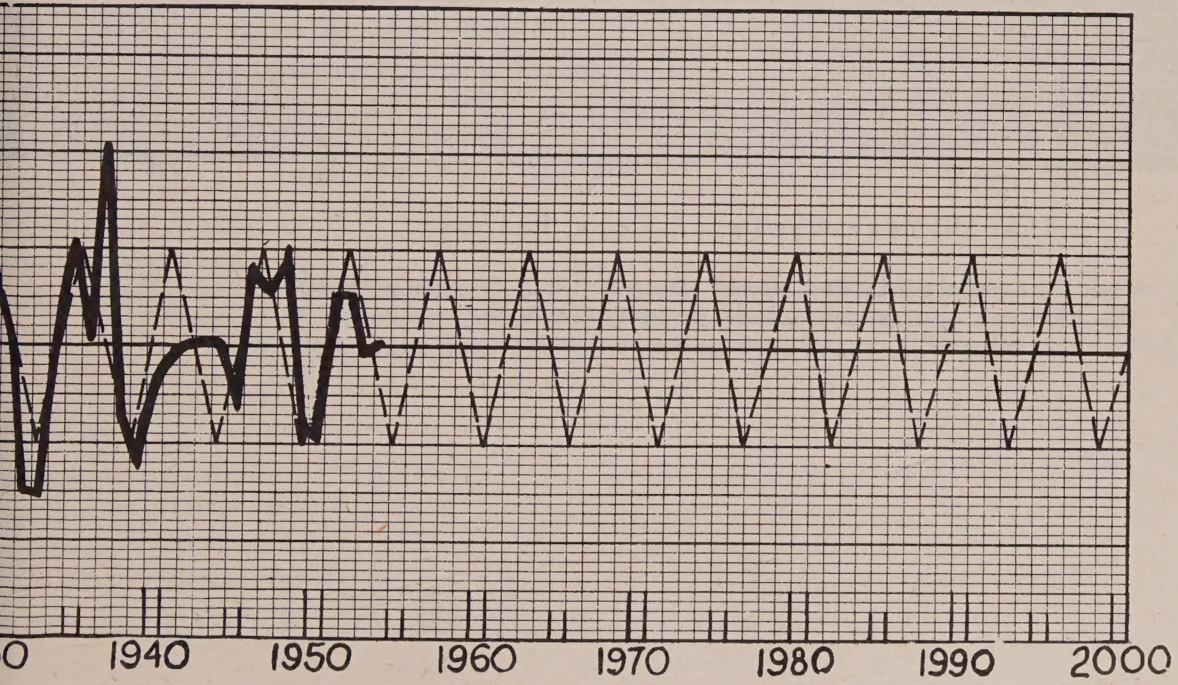
1940
1950
1960
1970
1980
1990
2000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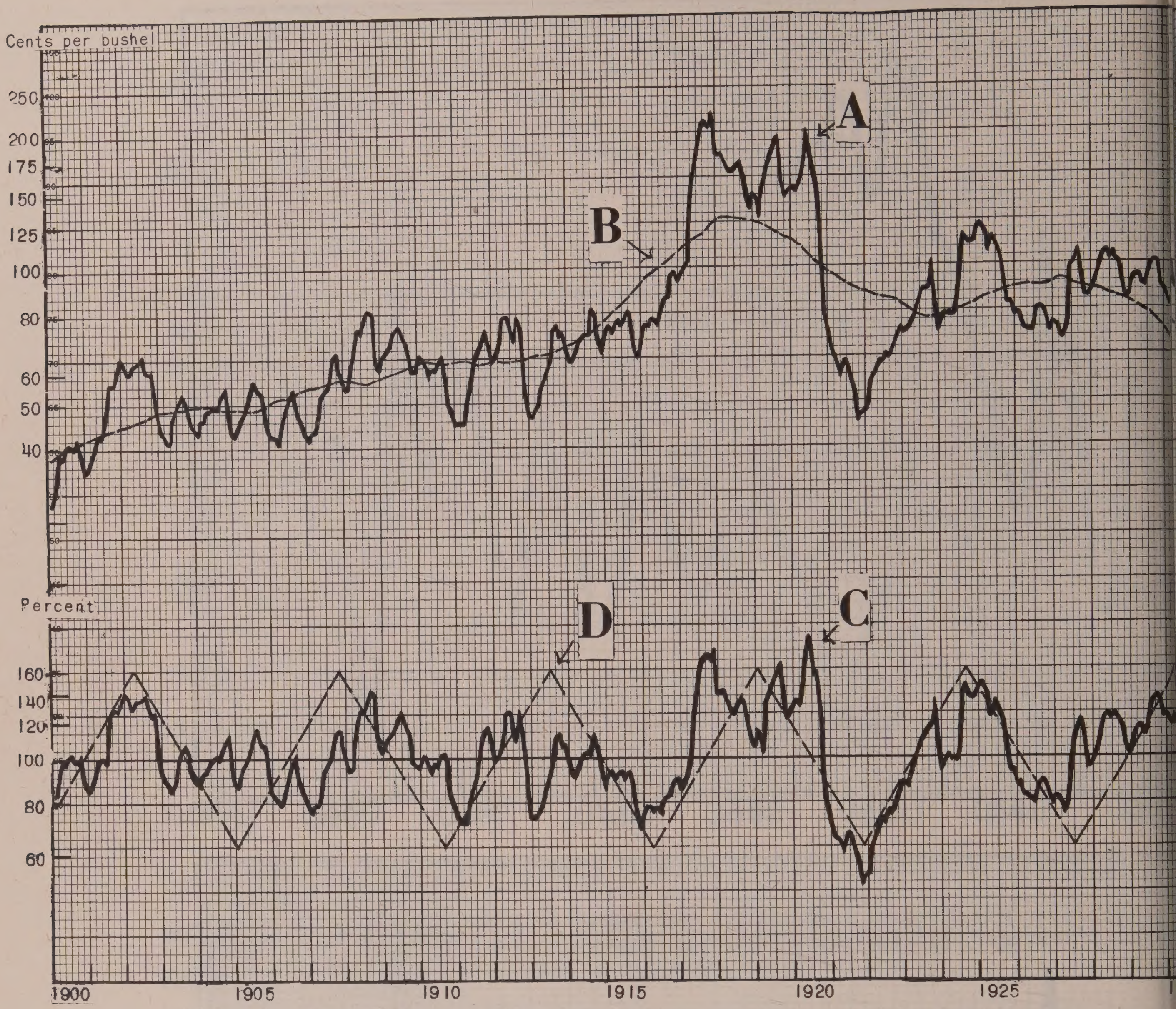
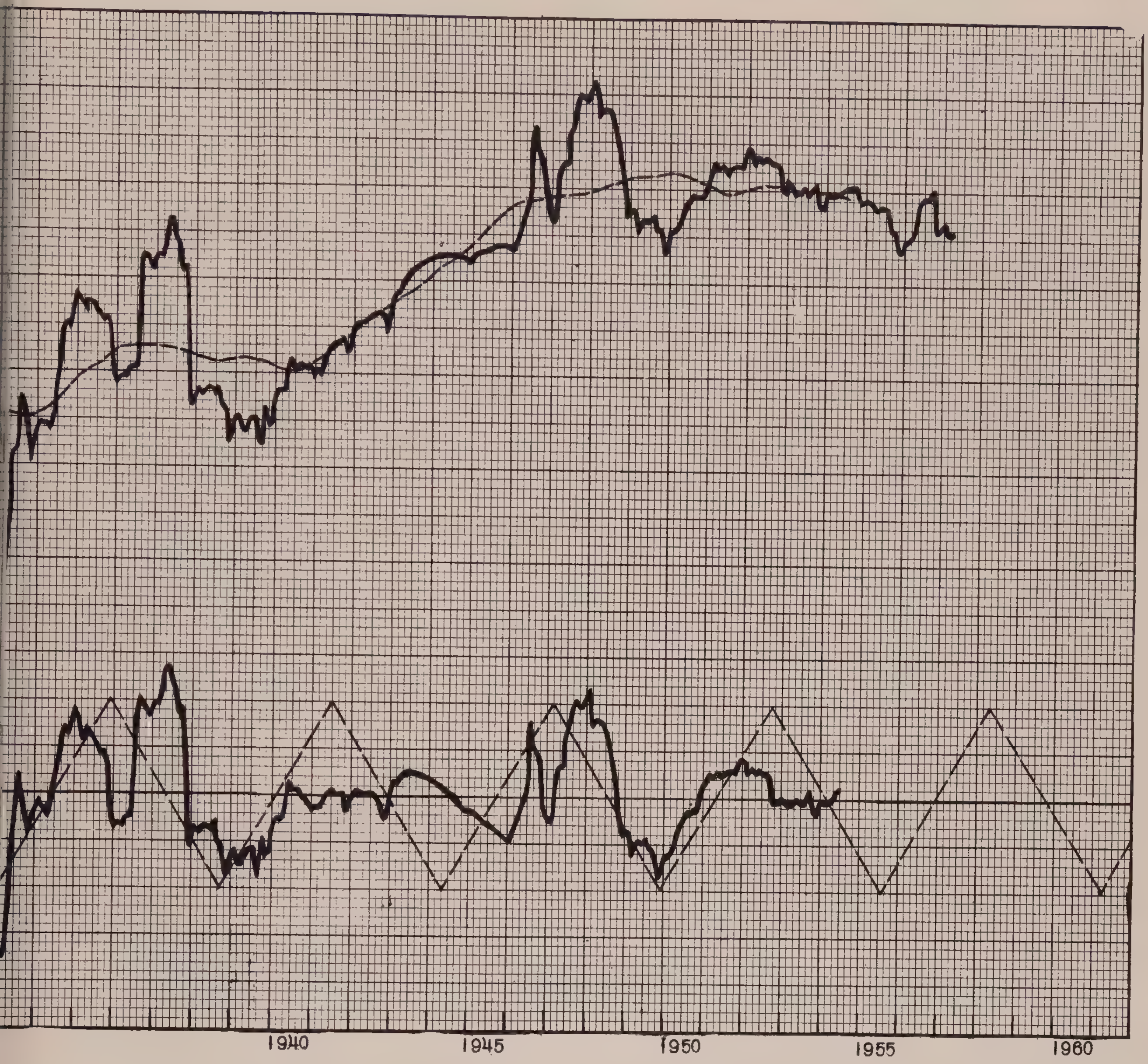


The 5½-Year Cycle in Corn Prices

Curve A. Corn Prices in cents per bushel January 1900--December 1954.
Curve B. The 65-month moving average trend of Curve A.
Curve C. The percentages by which corn prices were above or below the trend.



Curve D. A perfectly regular 5.61-year (67 1/3-month) zigzag to diagram the typical behavior of this cycle over this period. Ratio Scale.

For an estimate of trend and cycle, January 1949—December 1961 see Fig. 1 on page 149.

times your losses!

Well, this same man, in the same book, recorded his observation of a W-shaped 11-year cycle in corn prices. A W-shaped 11-year cycle is of course two 5½-year cycles every 11 years. However, Benner called it a 5-year—6-year cycle. He put his highs in 1864-5; 1869-70 (5 years later); 1875-6 (6 years later); 1880-1 (5 years later); etc: His lows in 1861-2; 1866-7 (5 years later); 1872-3 (6 years later); 1877-8 (5 years later); etc.[1]

Benner's Record

Benner had only a few figures at his disposal. Moreover the techniques of his day were crude and inadequate. Benner was, therefore, not able to measure the length of his cycle more closely than I have indicated above. Nevertheless, if you had bought and sold corn annually from 1875-6 to date on the basis of this cycle as established and projected by Benner your gains would have been three and a quarter times your losses.

Remember that these hypothetical gains come from buying and selling at average *annual* prices. Buying and selling during the proper *month* would surely have been much more profitable. Remember too that there are other cycles also present in these figures. A knowledge of them should increase trading profits materially.

The really important part of all of this is that the years in which to buy and to sell were picked out *in advance* by an old fellow who lived way back long before you were born.

The Cycle in the Annual Figures

Now let us look at this cycle with the benefit of hindsight and modern techniques. Is it exactly 5.5 years long or slightly longer or shorter? Is it non-symmetrical as Benner thought, or is it symmetrical? Do the crests and troughs come when Benner thought, or is the true timing slightly different? We must know all these things if we are to true up Benner's forecast so that it will continue to work for the next 82 years.

Benner's 5½-year cycle can be seen by inspection of the annual figures, 1857 to date. See Fig. 2.

You can see the cycle better if you remove trend. Trend is shown by the broken line in Figure 2. To remove trend you merely express the actual prices as percentages above or below trend. This has been done. The results are charted in Figure 3. A perfectly regular 5½-year cycle has been added by means of a broken line. The regular or ideal cycle will aid your eye so that you can more easily see when the 5½-year pattern has dominated and when it has not.

As nearly as one can tell from the *annual* figures, the cycle is 5.5 years long or a shade under—perhaps 5.47 years.

A study of *monthly* figures, should give us more accurate results. Such a study, January 1899 to date shows:

Length 67-1/3 months. Average strength, 130% of trend at time of crest, 77% of trend at time of trough. Ideal time of last trough, July 1955. Ideal time of next crest, April 1958.

When I have time I will carry the monthly work back to 1858 to get what I hope will be a still better determination of cycle length, strength and timing.

Prices Charted

Fig. 4 graphs corn prices, January 1900—March 1957, trend, percentages above and below trend, and the 67 1/3-month cycle respectively.

It is not to be expected that the fifty years from 1858 to 1900 will show the exact length of 67-1/3 months. There are doubtless other cycles in combination which, temporarily, make the 5½-year cycle look longer or shorter than it really is. That is why we need to use the longest possible series of homogeneous figures to get its exact length.

Summary

A 5½-year cycle was discovered in 1875. It has continued to assert itself over an 82-year period.

---

[1] THESE DATES WILL SEEM WRONG TO THOSE WHO HAVE READ BENNER'S BOOK. BUT THEY ARE NOT. BENNER SAYS "1864." HE DOES NOT SAY "1864-5." BUT THE PRICE HE QUOTES FOR 1864, FOR EXAMPLE, IS THE PRICE FOR 1864-5. EITHER HE DID NOT KNOW THAT PUBLISHED PRICES WERE FOR CROP YEARS BEGINNING NOVEMBER, OR HE SOUGHT TO SIMPLIFY HIS EXPOSITION.

TABLE 1

Imaginary Purchases, Sales, and Short Sales of Corn on Basis of 67 1/3-Month Cycle, May 1899—March 1957

(Short positions covered during war)

Month of Ideal Highs & Lows	Cash Price Corn - Cents Per Bushel at Month of Ideal Cycle High & Low				Gain or Loss			
					In Cents		Per Cent	
	Buy	Sell	Short	Cover	Long	Short	Long	Short[1]
May 1899	33							
Mar. 1902		59	59		26		79	
Jan. 1905	42			42		17		40
Oct. 1907		65	65		23		55	
Aug. 1910	64			64		1		2
June 1913		60	60		-4		-6	
Mar. 1916	73			73		-13		-18
Jan. 1919		143	143		70		96	
Nov. 1921	47			47		96		204
Aug. 1924		117	117		70		149	
June 1927	99			99		18		18
Apr. 1930		82	82		-17		-17	
Jan. 1933	24			24		58		241
Nov. 1935		62	62		38		158	
Sept. 1938	53			53		9		17
June 1941		74	74		21		40	
Dec. 1941[2]				76		-2		-3
Apr. 1944	116							
Feb. 1947		142	142		26		22	
Nov. 1949	116			116		26		22
Sept. 1952		176			60		52	
July 1953[3]			158					
July 1955	147			147		11		7
Apr. 1958		?	?					
Feb. 1961				?	?		?	

	Long	Short
Gain	651	551
Loss	-23	-21
Net Gain	628	530

Total Gain	1202
Total Loss	44
Net Gain	1158

Average per year (1899—1955), 20.3%.

---

[1] PERCENT PROFIT ON SHORT POSITIONS FIGURED ON COST (I. E. COVER) PRICE.

[2] SHORT POSITION COVERED AT BEGINNING OF WAR.

[3] SHORT POSITION ESTABLISHED AT END OF WAR.

It cannot reasonably be the result of chance. It cannot reasonably be the result of internal corn price dynamics. It must therefore reasonably be an environmental force. There is reason to believe that this force may come from outside the earth.

To help us run down the cause of this cycle we need to measure its length as exactly as possible. This article reports upon the start of such an investigation.

In the period 1899 through 1957 the cycle was found to be 67 1/3 months (5.61 years) long. As the investigation proceeds a more accurate determination of length will be possible.

This is only one of many cycles present in corn prices. However trading on this one cycle alone you would have made 27 times as much as you lost, 1899 to date. Your gain would have totaled 1158% net (before brokerage), or 20.3% a year.

When this report reaches you we will be within ten months of the ideal time of high as determined from a study of data January 1899 through March 1957. After that time the 5½-year cycle will, if it continues, exert a downward force which should be taken into account, along with all other factors, by those who need to know the probable future price of corn.

E. R. D.

COMET CYCLES

Do the forces which cause cycles on earth have their origin outside the earth? If so, do they also have an effect upon the rotation period of the planets and their moons? Do they have an effect upon the time required for the various heavenly bodies to go around the sun? No one knows, but one way to get a lead is to compare the various earthly and heavenly cycle lengths.

I have already given you for reference the time required for the various planets to travel around the sun (*Cycles*, September 1953, pp. 219-221). Now I am giving you the time that it takes the short period comets to make a similar journey. "Short period comets" are those with periods of less than 100 years.

The names of the comets and the time required for one complete revolution around the sun are given in the following tables. I do not notice many correspondences with terrestrial cycles with which I am familiar.

SHORT PERIOD COMETS

Short Period Comets of More Than One Apparition

Comet	Years
1950 e Encke	3.30
1907 III Tuttle-Giacobini	4.13
1947 a Grigg-Skjellerup	4.90
1927 I Neujmin (2)	5.43
1946b Tempel (2)	5.31
1879 I Brorsen (1)	5.46
1908 II Tempel-Swift	5.68
1894 IV de Vico-Swift	5.86
1879 III Tempel (1)	5.98
1945 a Pons-Winnecke	6.15
1945 b Kopff	6.18
1948 e Forbes	6.42
1909 III Perrine	6.45
1947 l Schwassmann-Wachmann (2)	6.53
1946 c Giacobini-Zinner	6.59
1852 III Biela	6.62
1950 d Daniel	6.66
1950 a d'Arrest	6.70
1926 V Finlay	6.85
1906 III Holmes	6.86
1932 IV Borrelly	6.87
1946 e Brooks (2)	6.96
1947 g Whipple	7.41
1947 f Faye	7.44
1949 f Reinmuth (1)	7.69
1942 VII Oterma (3)	7.89
1943 V Schaumasse	8.16
1950 c Wolf (1)	8.42
1944 II Comas Sola	8.50
1949 h Väisälä (1)	10.52
1938 I Gale	10.99
1939 X Tuttle	13.61
1941 VI Schuwassmann-Wachmann (1)	16.15
1948 f Neujmin (1)	17.93
1928 III Crommelin	27.91
1942 IX Stephan-Oterma	38.96
1913 VI Westphal	61.73
1919 III Brorsen-Metcalf	69.06
1884 I Pons-Brooks	71.56
1887 V Olbers	72.65
1910 II Halley	76.03

Short Period Comets of Only One Apparition

Comet	Years
1949 g Wilson-Harrington	2.3
1766 II Helferzrieder	3.89
1945 c du Toit	4.56
1948 n Honda-Mrkos-Pajdusakova	5.00
1819 IV Blanpain	5.10
1884 II Barnard (1)	5.40
1930 VI Schwassmann-Wachmann (3)	5.43
1743 I Grischow	5.44
1941 VII du Toit-Neujmin-Delporte	5.52
1886 IV Brooks (1)	5.60
1770 I Lexell	5.60
1939 VII Kulin	5.64
1783 Pigott	5.89
1916 I Taylor	6.37
1890 VII Spitaler	6.37
1947 j Reinmuth (2)	6.57
1892 V Barnard (2)	6.63
1896 V Giacobini (1)	6.65
1918 III Schorr	6.71
1949 d Johnson	6.85
1895 II L. Swift	7.22
1948 b Wirtanen	7.25
1894 I Denning (2)	7.42
1948 i Ashbrook-Jackson	7.47
1924 IV Wolf (2)	7.49
1949 e Shajn-Schaldach	7.76
1906 VI Metcalf	7.77
1881 V Denning (1)	8.49
1936 IV Jackson-Neujmin	8.53
1889 VI Swift	8.92
1929 III Neujmin (3)	10.90
1846 VI Peters	13.38
1944 III du Toit	14.87
1866 I Tempel	33.16
1827 II Pons-Gambart	46.0?
1883 II Ross	64.6
1921 I Dubiago	67.0
1846 IV de Vico	75.7
1942 II Väisälä	85.5

The above information is taken from *Comets and Meteor Streams* by J. G. Porter, published in London by Chapman & Hall Ltd., 1952, and furnished to us through the courtesy of the Encyclopaedia Britannica Library Research Service, 425 North Michigan Avenue, Chicago 11, Illinois.

LONG TERM GROWTH TRENDS IN THE AMERICAN ECONOMY*

by Edward R. Dewey

I

Why Trends Are Important

THE facts of growth are common knowledge to most mothers, who are encouraged by doctors to keep a weight chart around the nursery, for reference at weighing time. All healthy babies, like other healthy young organisms, show large initial rates of growth—over 100 per cent for babies the first year. As they get older, the rate of growth gradually falls off. At the approach of maturity, the rate of growth finally reaches zero.

Why it is that an organism stops growing we do not really know. We believe that biological organisms—whether dogs or babies or other animals—have their growth controlled by inhibiting secretions of glands. We are not so sure what it is that controls the size of different kinds of trees, or, say, a Jimson weed.

But knowledge that such an inhibiting factor does exist is important to us, even when we cannot explain it. We find it reasonable that such a factor should be at work in organisms like a baby or a tree, just because we are used to observing it in action. But it also works in other kinds of organisms, such as human institutions and business organizations.

Few executives are used to thinking of a business enterprise as an "organism." But it does have a rate of growth that can be shown by a trend line. For the weight figures, which we might consult in establishing the trend for a baby, we can readily take the business output, as revealed in successive sales figures.

Suppose we draw such a trend for a hypothetical business organization which shows average annual sales of $20,000 during its first year of business, and proceeds as follows:

		Annual Sales	Five-Year Growth
1915	Company founded	$ 20,000	
1920	Five years after founding	38,000	18,000
1925	Ten years after founding	68,000	30,000
1930	Fifteen years after founding	116,000	48,000
1935	Twenty years after founding	186,000	70,000
1940	Twenty-five years after founding	279,000	93,000
1945	Thirty years after founding	391,000	112,000
1950	Thirty-five years after founding	508,000	117,000
1955	Forty years after founding	609,000	101,000

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*A REVISION OF CHAPTERS I-IV OF *Cycles—The Science of Prediction* BY EDWARD R. DEWEY AND EDWIN F. DAKIN, TOGETHER WITH SUPPLEMENTAL MATERIAL.

Offhand this looks like a business that has been expanding rapidly, with a satisfactory forward thrust every five years. But if we analyze the figures, we find them showing signs of what, on the contrary, is a "dying" business. Years may pass before the business really goes under. But it has long been approaching maturity. What the figures show us is a steady decline in the *rate* of growth. The declining rate, by five-year periods, is as follows:

RATE OF GROWTH

1915—1920, 90% of actual sales in 1915
1920—1925, 80% of actual sales in 1920
1925—1930, 70% of actual sales in 1925
1930—1935, 60% of actual sales in 1930
1935—1940, 50% of actual sales in 1935
1940—1945, 40% of actual sales in 1940
1945—1950, 30% of actual sales in 1945
1950—1955, 20% of actual sales in 1950

It is obvious from the table that during each five-year period the rate of growth of this hypothetical business has decreased 10 per cent and that, if these tendencies continue, the rate of growth in the future will be:

1955—1960, 10% of actual sales in 1955
1960—1965, 0% of actual sales in 1960

In other words, we see that by 1965 the momentum will cease entirely. By then the organization will become another one of those many which follow a groove in a mature and conservative way—probably entering into a moderate decline until either aggressive competition shoves it aside entirely or "new blood" comes into the picture to give the aging institution a new start-off. A chart showing the sales for this hypothetical business would look like the solid line in Fig. 1.

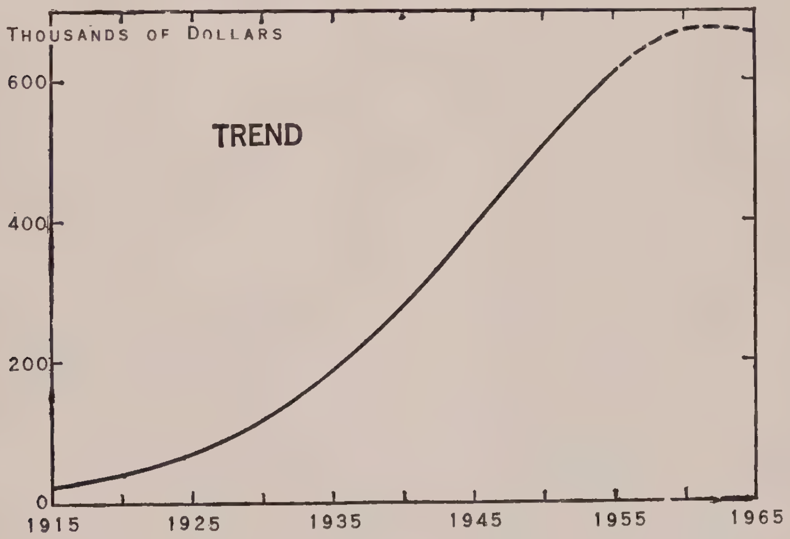

FIG. 1. TREND OF A HYPOTHETICAL BUSINESS ORGANIZATION

Data—1915—1955, with a projection to 1965. The projection is based on the assumption of a continuation of the constant decline of the rate of growth, as discussed in the text.

This line can easily be projected. We have assumed that sales in 1960 will be 10 per cent greater than 1955. The table shows that sales in 1955 were $609,000. Adding 10 per cent gives $669,000, projected sales for 1960. Assuming that 1965 sales will show no growth over 1960 gives a sales total of $669,000 for this year also. The projected figures are shown by a broken line. Projections of this sort, based on rate of growth pattern and showing the approach to what we may call "maturity," are important tools for all students of practical economics.

In our hypothetical picture here, the design is that of a very regularly declining rate of growth—a regularity which is hardly typical of any of the institutions we shall study. But it is useful for illustrating a fact that both businessmen and investors usually overlook. *The rate of growth in an organism is a sound index to its vitality.*

It has become the custom in recent times, for instance, for investors to look well on organizations that have paid regular dividends over a long period of years without a gap. Such a record does bespeak sound, conservative management. But it does not suffice, taken alone, to show that an organization has in it the vitality to continue successfully if dynamic new competition rises to face it.

In an era when entirely new sources of energy are being discovered, and when our industrial chemists are creating commercially new materials that never even existed before; when we enslave new breeds of living organisms and put them to work for us in vats; when any country with raw materials can make machines and any nation with machines can make raw materials*—in such a day new forms of competition can arise rapidly. Therefore the trend line in established industries becomes a more important economic study than ever before. Just as the figures for any one business may be analyzed to reveal the trend, so may the figures for a group of businesses, such as those that comprise a manufacturing industry.

In the United States we have a number of great industries—often called "basic" industries—which are fundamental to the support of our established pattern of living. The trends in these industries are of significance to all of our people, and not merely to the executives and workers and stockholders in those particular fields. Such trends do not have isolated meanings. They indicate plainly the state of given organs in the economic body we call the nation. If a similar trend shows up simultaneously in a number of the vital organs, we have conclusions that are in many ways applicable to our nation as a whole.

As we shall see shortly, the trends existing in a number of our great industries show definitely that we are nearing a period of basic "maturity" in our whole economic development. This is a fact of enormous implications that reach in many directions. The implications are so great, indeed, that many people (as usual with humanity) find it easier to deny the fact, in heated argument, than face it honestly and then proceed to deal with it. The argument has reached into the realm of politics—where the only justifiable debate should be concerned not with the reality of the fact, but with what to do about it. It has entered the life of the average man; it has entered the lives of business and social institutions; it is reflected alike in national defense problems and literary patterns.

Here the fact will concern us in just one fundamental way: its effect on business cycles. Business cycles—I shall later define the term more exactly—are not up and down departures from a horizontal line. It is more useful to think of cycles as waves moving around a curved axis, that axis being the trend. (If you like to think in terms of pictures, throw away the one of cycles seen as the jagged peaks of a level picket fence. Visualize instead the peaks of a fence going up and down hill, or a coil-spring which is stretched over a bent poker as the core.)

A more or less typical trend line, around which a simple cycle is moving, looks approximately like Fig. 2. If this trend line represented the growth of your own business, and the cycle represented ups and downs in sales, one thing would be

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*See Virgil Jordan's *Manifesto for the Atomic Age* (Rutgers Press, 1946), p. 21ff.

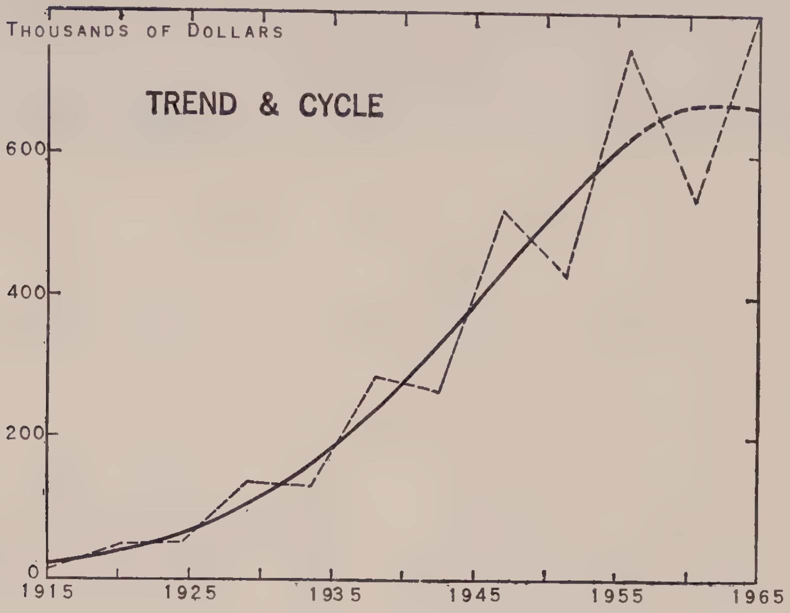


FIG. 2. THE TREND AND THE CYCLE

Trend of a hypothetical business organization as shown in Fig. 1 with a regular 9-year cycle of 20 per cent amplitude superimposed.

clear: you would not feel dips in the cycle nearly so seriously when you were growing rapidly as you would when the trend had leveled out. For when the trend is shooting up at a rapid *rate,* the bottom of one cycle is a "depression" only by comparison with its own peak. The bottom may be actually as a *higher* level than the peak of activity in the preceding cycle.

This fact applies to every single business, and it applies to a whole economy. In the years between the Civil War and World War I. when the American economy was expanding at a very rapid rate, the bottom of one depression often represented a level of economic activity not much lower than preceding peaks of prosperity. Hence many a businessman of that extraordinary era knew just two kinds of "times"--times when business was good, and other times when it was better. Business, even in depressions, was good; although it was under the level of recent peaks, it was still equal or possibly even superior in volume to levels established at other peaks in the fairly recent past.

The businessman is going to have to anticipate depressions and plan for them wisely, or suffer unprecedented penalties. In the years when our economy was expanding rapidly, a businessman might make very faulty judgments and yet be saved from disaster, or even thrust into success, by the sheer momentum of the national growth. If he failed to sense the coming of a depression, or to time it accurately, why worry? Even the depression bottom was higher than the peak of a few years before. This situation is no longer true. A greater premium than even before is imposed on the ability to time the turns in the business cycle correctly.

In very recent years we have discovered a great deal of new information on this subject, and a new application of scientific methods in its use. But before we reach the problem of the cycle we must know more about trends, and how they are determined and estimated.

Letters

SUCCESSFUL CYCLE WEATHER FORECASTING

Dear Mr. Dewey:

When you said, in a recent issue, that you were going to put the Cycle study on more of a "shirt-sleeve" basis, in order to accede to suggestions along this line from your readers, I didn't expect such beneficial results so suddenly. The last issue certainly achieved that aim. It appealed to me as the most interesting and understandable that I've received.

Heretofore, I've considered this study as being far over my head, and hardly of real use. But now you make me realize that I am making use of cycles, mainly in forecasting weather! Let me tell you about it, although it may well be that you are better acquainted with this particular set of cycles than I am.

Some years ago, Mr. H. P. Gillette, editor of "Roads and Streets" and other trade magazines, published a series of articles in regard to harmonic rain cycles, based, among other sources of information, upon varves in the sediments of Lake Saki in the Crimea. These varves, similar to tree rings, but in this case yielding a record back to 2300 B.C., or 1000 years longer than the tree ring records in the Sequoias, are borne out of similar varved rocks near Los Angeles.

These varves seem to show rainfall cycles of 21, 63, 147, 189, 567, and 1701 years.

Carl Belser, a Bureau of Mines engineer residing in Boulder, Colorado, became interested in these weather cycles, took up their study as a hobby, worked out detailed cycles, charted them, and has copyrighted the result. Forecasts based upon his conclusions are astonishingly accurate.

Among his conclusions are: (1) There are 18 weather cycles, of 2.134, 6.408, 9.365, 19.224, 28.096 days; 2.31 months; and of .476, 1.43, 2.05, 4.29, 5.79, 8.08, 9.47, 13.68, 24.23, 41.05, 72.69, and 123.16 years.

(2) The next minima of cycles will occur in 1966, so that the drouth will continue to increase until then, and dry weather will be with us until 1985.

(3) The 1701-year cycle will be imposed upon the year 1966, indicating greater dryness than ever. This will be the greatest culmination of minima since the famine of Diocletian in the year 301.

Since the early '40's, with only a wartime intermission, I have posted one of Belser's annual weather charts, and have kept careful notations thereon as to the results. These results indicate that he is already more than 80% accurate. Belser does not claim accuracy, but watches it as interestedly as anyone else, stating that someone with time and finances should study it a great deal more thoroughly than he has been able to.

I now have the weather charts through 1964, and from them do not hesitate at this moment to forecast storms for February 8, March 3, April 27, November 11, 1958; February 3 and October 14, 1959; March 3, 1961; November 24 and December 10, 1963; January 21 and November 10, 1964. These are a few random selections out of 90 or 100 that can be forecast. The springs of 1958 and 1964 are indicated as very wet; the years of 1959 and 1960 show exceptionally dry.

Taking the chart for the present year, we can see that the forecast was for storms on January 4, 12, 19; February 1, 26; March 1, 18, 29; April 6 and 26. Here are the results: (bear in mind that the storms usually make up in the Pacific Ocean or in Canada, travel easterly, circle the north end of the Rockies and eddy back into the Denver area from 1 to 4 days later.)

Storm Fore-Cast	Result
1/4	General snow west of Rocky Mountains 1/4
1/12	Heavy snow west side. Snow east side 1/14.
1/19	General storm 1/21. (Probably began the 19th). 1/25 Heavy snow not forecast by chart. 1/27 3″ snow not forecast by chart.
2/1	General overcast and light snow on 1/31.
2/26	4″ wet snow afternoon of 2/27.
3/1	Rain 3/3, snow 3/4, 3/13 Statewide 2′ snow, not forecast by chart.
3/18	Storm makes up in Pacific northwest (radio), reaching Colorado and surrounding states on 21, 22, creating extreme blizzards and great damage. Radio forecast no further storm in sight. I forecast storm the 31st.
3/29	Overcast 30 and 31. Rain 4/1. Seasons heaviest snow on 4/2. Great damage. Radio forecasts snow for 4/6. I also, 4/4, forecast a storm for 4/6.

The chart indicates precipitation for 5/24, 6/22, 9/15, 11/10, 12/7 and 12.

The weather so obviously proves these rain cycles correct, that it seems to me that the weather bureau ought to quit guessing, and use these cycle charts.

Sincerely yours,
Harrison S. Cobb

401 Pine Street
Boulder, Colorado

In Reply I Said:

Dear Mr. Cobb:

May I print your interesting letter of April 4? I assume your forecasts are merely for Boulder, Colorado.

Ever cordially yours,
Director

Mr. Cobb Answers

Dear Mr. Dewey:

I have talked with Mr. Belser, and find that it is agreeable to both of us if you wish to publish my letter. Use my name if you see fit.

It would not be exactly correct to indicate that these forecasts are for the Boulder area, because results seem to show that the cycles bring on worldwide weather conditions. This does not mean that there is a world-wide storm at a given time, but it appears that certain storm-breeding zones develop the storms at these times, and after that, the storms travel, reaching different points at succeeding dates. Our storms often make up in the north Pacific, in the Pacific Northwest, or in western Canada, and reach us two, three, or four days after the starting date.

Carl Belser took his data from the work of Halbert P. Gillette, editor of "Roads and Streets". Gillette had evidently correlated sedimentary varves, and tree rings, with characteristics of eighteen electron shells which supposedly surround the earth. Among these are the Appleton, Kennelly, and Heaviside shells, of which most of us have heard. I have not heard the names of the others. Belser plotted these cycles on graphs, using the known duration of each cycle. When he had made the chart for the first year, 1940, I believe, he was amazed to find that this chart had hit the first five storms right "on the nose".

An interesting observation may be made that, although the powers that be state that the atomic bombs have no effect on weather, nevertheless the weather charts are always haywire during and for some weeks after a series of bomb tests, and always on the wet side.

Mr. Belser will no doubt be willing to contribute to your publications. It might make it simpler if you would be willing to suggest phases of the idea, or questions upon it, for him to consider. If the subject is sufficiently interesting to the membership of the foundation, we can make one or more of the annual charts available for publication.

Sincerely yours,
Harrison S. Cobb

401 Pine Street
Boulder, Colorado

THE BEGINNER'S CORNER

RATIO LINE CHARTS—CONTINUED

If you want to study growth trends or cycles you must almost always use ratio charts.

In April I told you about ratio charts. I printed two samples of ratio ruling for you so that you could chart your own figures. One sample was of one cycle ruling; the second of two cycle ruling. You use the one cycle paper when the biggest of the values you want to chart is no more than 10 times the smallest. When the highest values you want to plot is over ten times the smallest and not over 100 times the smallest you use two cycle paper.

Even this range is often not enough, particularly with long series of figures or for company sales that began with very low values. On pages 168 & 169 I have therefore reproduced for you samples of three and four cycle paper. Five cycle paper is also available.

Multi-cycle paper often makes it easier to plot several series of figures on the same chart. For example, with paper of several different cycles you can plot, one under the other, the sales of each of several different departments, or the prices of each of several different stocks or bonds.

Any good stationery store should carry a large range of chart paper, but some of them don't. I'd therefore suggest, if you wish to do any amount of charting, that you drop a line to the Codex Book Company of Norwood, Massachusetts for a copy of their free catalog. You will find dozens and dozens of kinds of paper listed and illustrated.

Ratio scale is used when you want to find cycles because one wave of a recurring cycle is generally about the same *percentage* above or below trend as another, and on ratio scale equal percentages show up as equal vertical distance.

Let me give you an example to show you what I mean. Suppose a company has a four year cycle and that the sales (or the prices of its stock) are represented by the following numbers:

Year	A Trend	B Cycle (in %)	C Sales Trend Times Cycle (Col. A Times Col. B)
1930	2	80	1.6
1931	2	100	2
1932	2	120	2.4
1933	2	100	2
1934	2	80	1.6
1935	2	100	2
1936	2	120	2.4
1937	2	100	2
1938	2	80	1.6
1939	2	100	2
1940	2	120	2.4
1941	2	100	2
1942	2	80	1.6
1943	3	100	3.
1944	4	120	4.8
1945	6	100	6
1946	8	80	6.4
1947	10	100	10
1948	12	120	14.4
1949	14	100	14.
1950	16	80	12.8
1951	18	100	18
1952	20	120	24
1953	20	100	20
1954	20	80	16
1955	20	100	20
1956	20	120	24
1957	20	100	20
1958	20	80	16
1959	20	100	20
1960	20	120	24
1961	20	100	20
1962	20	80	16

Fig. 1 plots these numbers on arithmetic scale, Fig. 2 on ratio scale. Note that in Fig. 1 you can hardly see the cycle in the early years when the trend was at 2. In Fig. 2 the cycle shows up just as strong in the early years when the trend is 2 as in the later years when the trend is 20.

These charts show you why, in almost all instances, you use ratio charts when looking for cycles.

G. Shirk

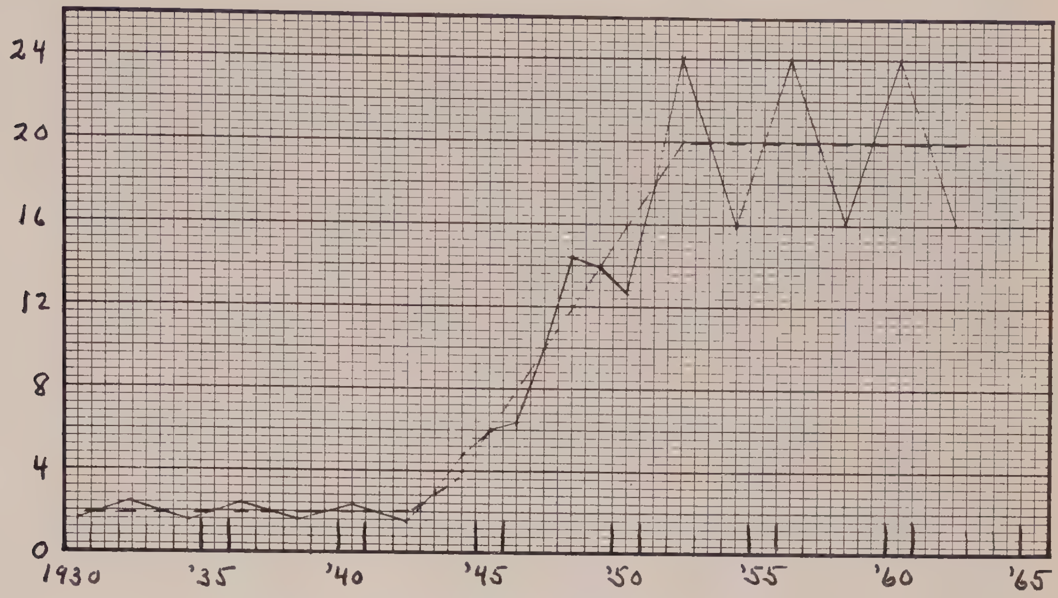


Fig. 1. Numbers Plotted on Arithmetic Scale.
(Broken line shows trend.)

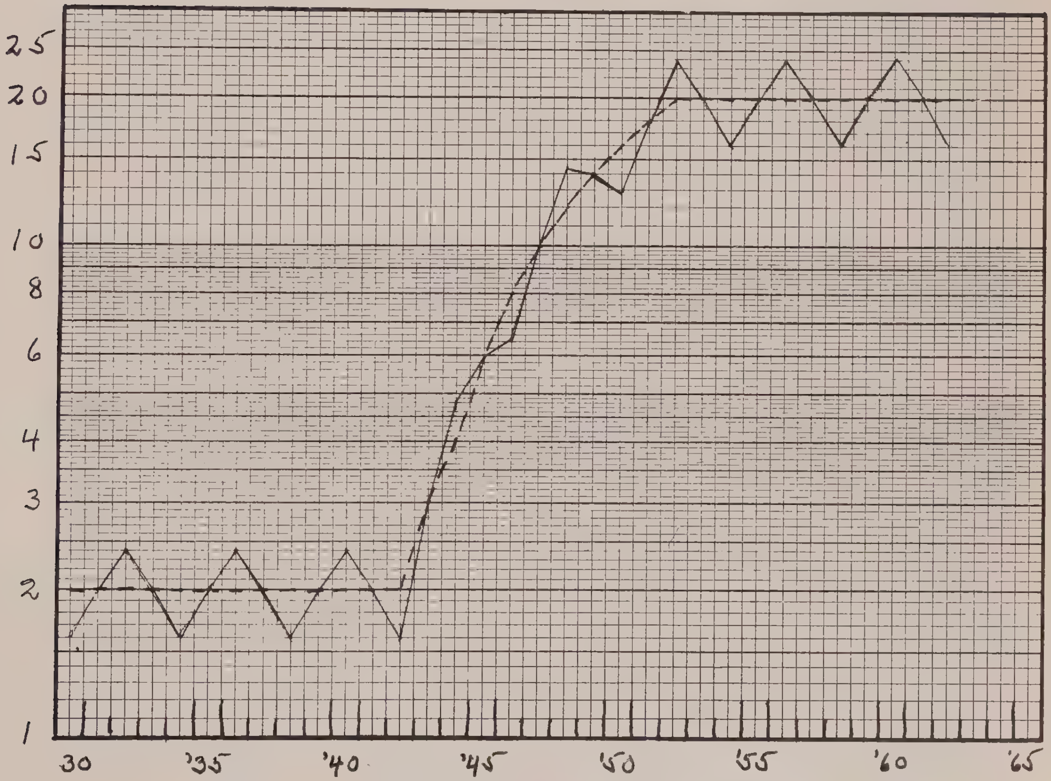
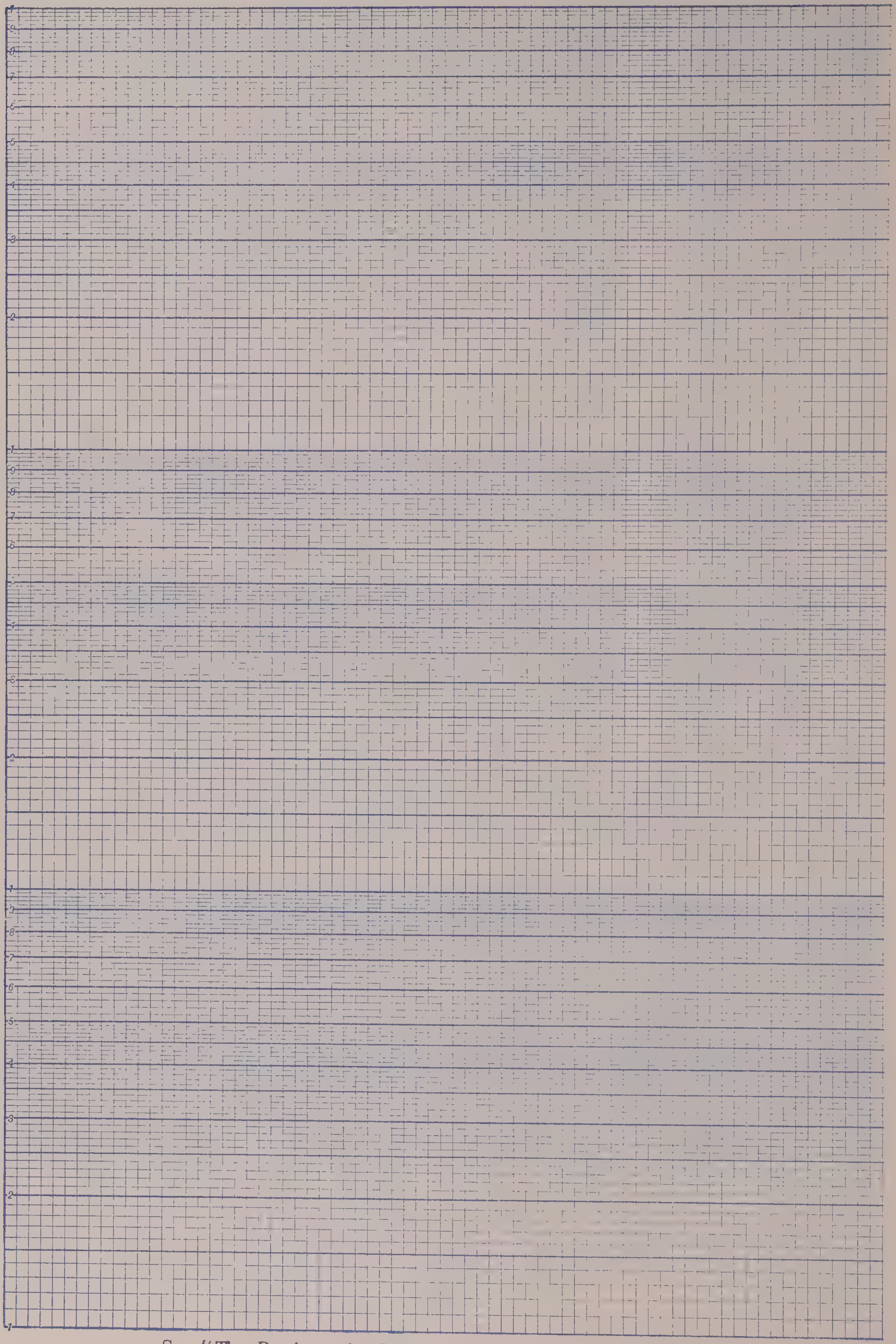


Fig. 2. The Same Numbers Plotted on Ratio Scale.
(Broken line shows trend.)

Note that the cycle shows up just as well when business is small as it does when the business is big.

SAMPLE OF 3-CYCLE RATIO CHART PAPER

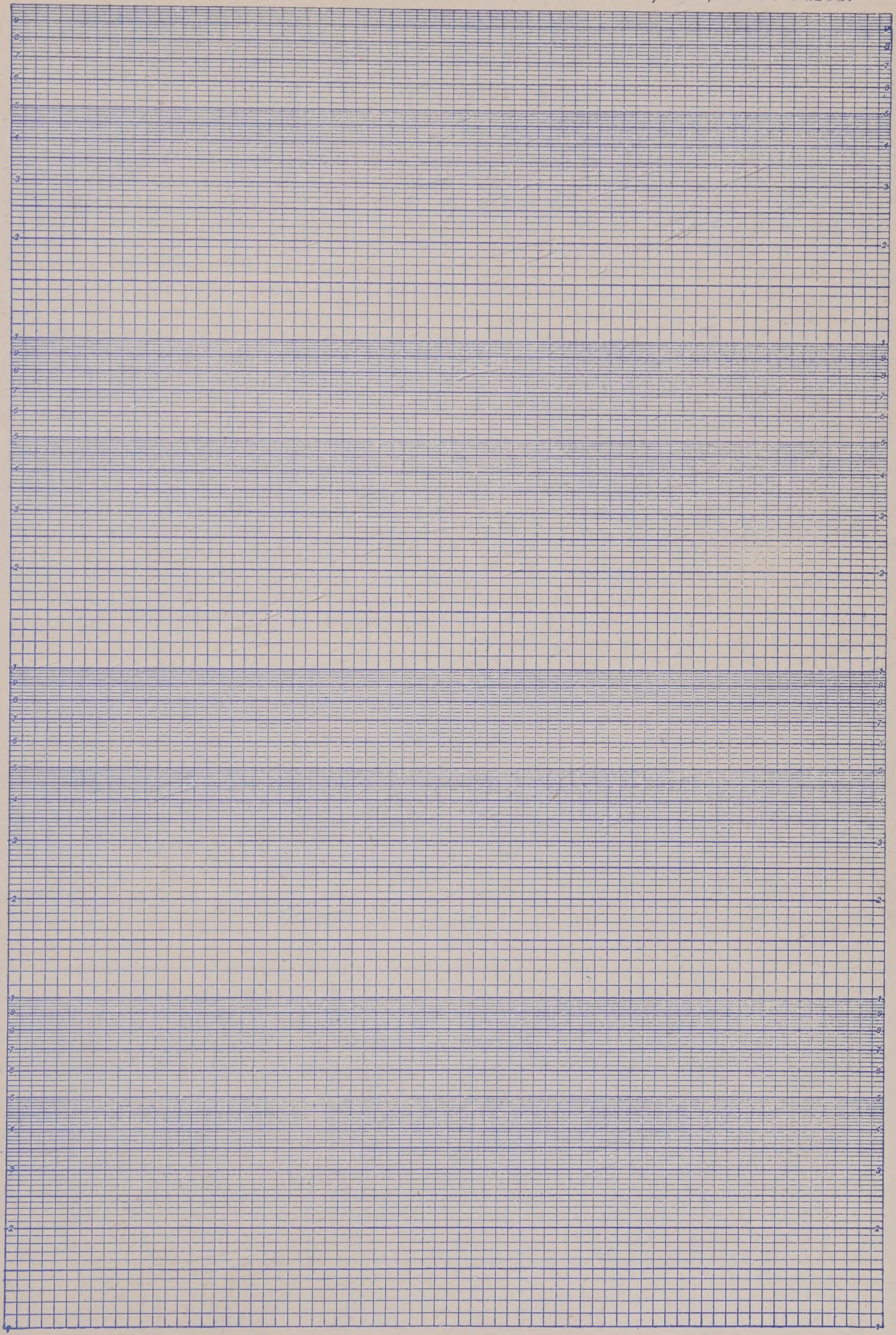
Horizontal scale, polypurpose. Vertical scale, 3 3-inch cycles, ratio ruled.



See "The Beginner's Corner," pages 166 and 167.

SAMPLE OF 4-CYCLE RATIO CHART PAPER

Horizontal scale, polypurpose. Vertical scale, 4 2¼-inch cycles, ratio ruled.



See "The Beginner's Corner," pages 166 and 167.

THE MODIFIED GEISINGER INDICATOR

BACKGROUND

THE Modified Geisinger Indicator is a series of numbers which, in the past, have gone up and down ahead of corresponding movements of the Federal Reserve Board Index of Industrial Production. Thd Modified Geisinger Indicator thus throws some light on the probabilities of the future.

The F. R. B. Index of Industrial Production measures physical production in the U. S. A. It is a weighted average of tons, yards, gallons, and numbers of things produced each month.

The Modified Geisinger Indicator is the sum of two Indicators, the Geisinger Indicator and a First Difference Indicator.

The Geisinger Indicator was invented by Robert Geisinger. It is derived from figures which are published each month in the *Survey of Current Business*. It is charted for you as Curve A on pages 114 and 115.

Curve B on these same two pages charts the First Difference Indicator, which is merely the amount by which the smoothed F. R. B. Index is above or below the value for the preceding month. The smoothing is effected by means of a centered 3-month moving average and a 2-month moving average posted to the second position.

Curve C charts the sum of the values of Curves A and B. This curve is called the Modified Geisinger Indicator. It suggests in a general way what the F. R. B. Index may do some eight months later.

Curve D charts the values of the F. R. B Index of Industrial Production.

Curve E re-charts curve C, advancing it by 8 months. This advance is for two reasons (1) so that you can more easily compare the past behavior of the Modified Geisinger Indicator with the behavior of the F. R. B. Index, and (2) so that you can have a better idea of what the F. R. B. Index may do in the future.

FORECAST

THE Geisinger Indicator for January 1957 (September 1957 when projected) has dropped to -3.2. Similar levels in September 1948 were followed by the set-back of 1949; in August 1951 by the set-back of 1952; in May 1953 by the set-back of 1954. The dip of the Indicator in May of 1956 proved to be a false alarm.

The F. R. B. Index of physical production is off slightly from 146 for March to 145 for April.

Increased caution in respect to the prospects for physical production in the latter part of this year is suggested.

E. R. Dewey

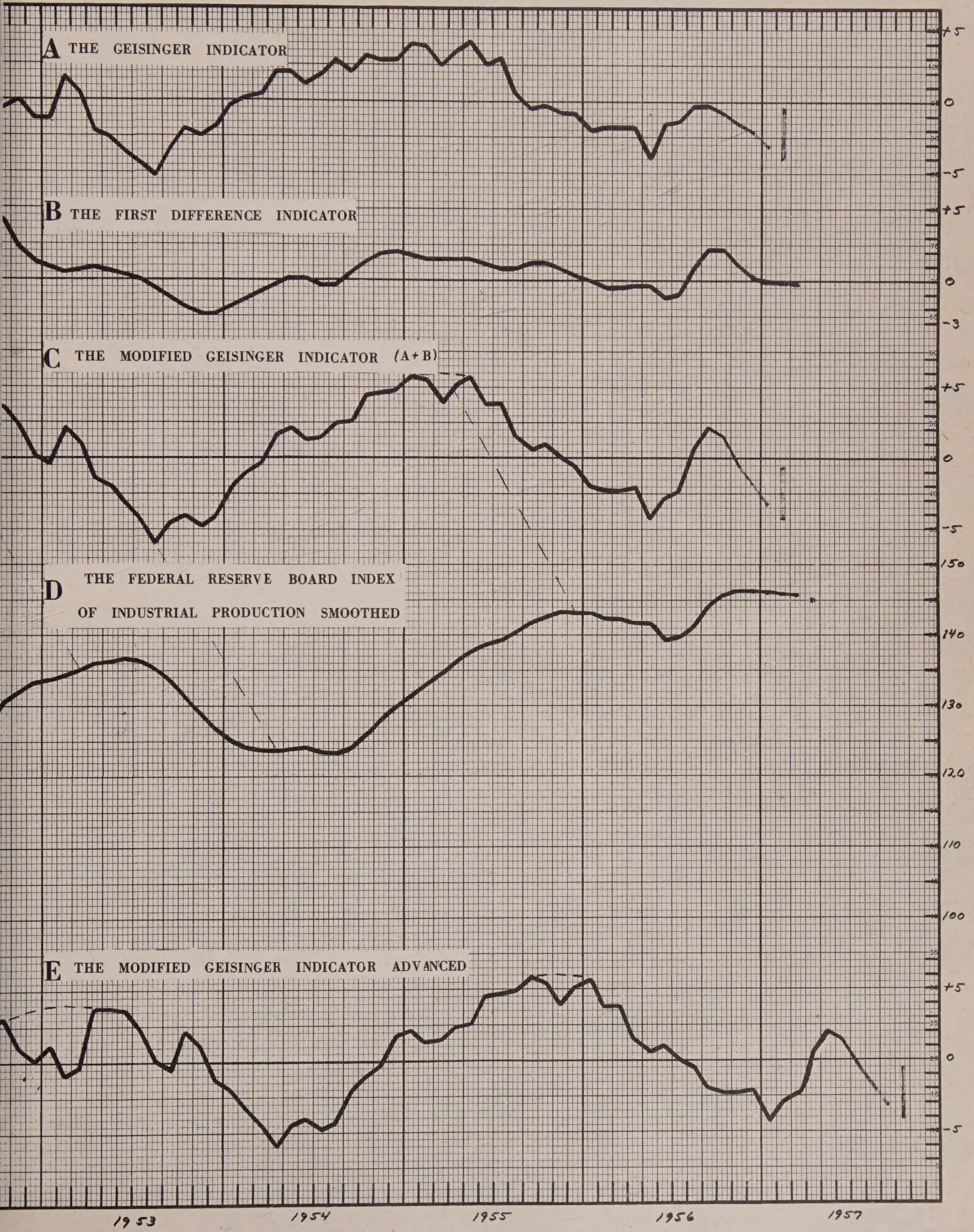
May 29, 1957

Month	Advanced (8 Months Later)	Geisinger Indicator A	1 st Difference Indicator B	Modified Geisinger Indicator A+B	F.R.B. Index D
Sept. 1956	May 1957	-.2	+2.33	+2.13	145
Oct. 1956	June 1957	-.8	+2.33	+1.53	146
Nov. 1956	July 1957	-1.6	+1.00	-.6	146
Dec. 1956	Aug. 1957	-2.2	+0.33	-1.87	147
Jan. 1957	Sept. 1957	-3.2	0.00	-3.2	146
Feb. 1957	Oct. 1957	*(-4.0; -.4)	−0.17	*(-4.17; -.57)	146
Mar. 1957	Nov. 1957	**	-0.33	**	146
Apr. 1957	Dec. 1957	**	**	**	145

*Indicator will lie between values given unless some values already published are revised.

**Not yet available.

THE MODIFIED GEISINGER INDICATOR OF INDUSTRIAL PRODUCTION



Mr. H. A. Musham
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